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EXAMINER	
PHAM, THIERRY L	
ART UNIT	**PAPER NUMBER**
2624	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/496,451	DOWNING, STEVEN P	
	Examiner	Art Unit	
	Thierry L Pham	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-30 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-30 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1. Claims 6-9, 12, 16, 22, and 29-30 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The specification does not provide an adequate written description of the limitations as recited in claims 6-9, 12, 16, 22, and 29-39, wherein "moving the printing element in a direction transverse to the swath axis"; therefore, it does not enable one skilled in the art to make, use and/or practice the invention.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Delacy (U.S. Patent No. 4734868).

a. Regarding claim 1, DeLacy discloses a method for high accuracy media position (accurately position the paper relative to a print head, col. 1, lines 8-9) in a swath printer (col. 13, line 28), comprising:

(1) mounting a computer-controlled printing element (wire matrix impact print head, ink jet print head, col. 7, lines 29-34), for movement along a swath axis (col. 5, lines 38-41) for swath printing of an image on a print medium (paper, col. 1, line 10);

(2) sensing (sensor, col. 4, line 34) the position of an edge of the just printed portion of said image which is nominally aligned with the scan axis (a sensor means for determining the position of the paper through edge or mark detection, and a control circuit utilizing the paper position feedback from the sensor to actively control the movement of the paper with respect to the print head, scan head or pen, col. 4, lines 25-30);

(3) providing relative motion between the print medium and the printing element to accurately position the printing element in dependence on the sensed position of the edge of the just printed portion of the image (the sensor senses the location of the edge of the demarcation and provides a positioning feedback signal to the drive means for accurately positioning the print head relative to the demarcation, whereby very accurate positioning of the paper relative to the print head is achieved, col. 4, lines 36-45) .

2. Regarding claim 3, DeLacy further discloses a method for high accuracy media position in a swath printer, wherein said step of providing relative motion is carried out on the fly (paper position error, col. 11, lines 63-68 and col. 12, lines 1-20) as the portion of the image is being printed and the print element is moving in the scan axis.

3. Regarding claim 3, DeLacy further discloses a method for high accuracy media position in a swath printer further comprising:

(1) activating (activates by an encoder and microprocessor, col. 8, lines 66-68 and col. 9, lines 1-3) a media advance mechanism to provide a nominal advance movement between the printing element and the print medium to position for a fresh swath (Abstract and Fig. 7, col. 11, lines 63-68 and col. 12, lines 1-20).

(2) moving the printing element along the swath axis to print at least a portion of the fresh swath (the print head is typically caused to ink the paper along a line or bounded series of lines (print band swath) orthogonal to the machine direction, col. 5, lines 37-51 and Abstract); and

(3) wherein the step of providing relative motion to accurately position the printing element in relation to the print medium is carried out between printing successive swaths (successive print lines, col. 10, line 45, and Abstract).

4. Regarding claim 4, DeLacy further discloses a method for high accuracy media position in a swath printer, wherein said step of providing relative motion between the print medium and the printing element is performed simultaneously with the step of moving the printing element along the swath axis to print at least a portion of the fresh swath (Abstract and col. 14, lines 27-34).

5. Regarding claim 5, DeLacy further discloses a method for high accuracy media position in a swath printer, wherein said providing relative motion between the print medium and the printing element is performed after printing a swath and before said moving the printing element along the swath axis to print at least a portion of a next swath (an edge 60 (Fig. 9) demarcates the beginning of the reference print line is projected to position 57 (Fig. 9) on photosensor 50 (Fig. 9) to create a position response signal. A signal is used to establish a reference for advancing the paper before beginning the next line of print or scan index, col. 11, lines 28-53).

6. Regarding claim 6, DeLacy further discloses a method for high accuracy media position in a swath printer, wherein providing relative motion between the print medium and the printing element to accurately position includes: moving the printing element (paper, col. 3, line 68) in a direction transverse to the swath axis (this invention is to provide a paper transport system capable of very accurate paper position relative to a print head capable of printing lines orthogonal to a direction of paper advance, col. 3, lines 65-68).

7. Regarding claim 7, DeLacy further discloses a method for high accuracy media position in a swath printer, wherein said step of mounting said printing element includes mounting the printing element in a movable carriage (drive belt, col. 2, line 51, and col. 4, line 34, and Fig. 3), and said moving the printing element in a direction transverse to the swath axis includes:

(1) positioning an actuating element (print head, Fig. 3, ref #12) between the printing element and the carriage (drive belt, ref # 24, Fig. 3); It is inherently known in the art that

an actuator (i.e. stepper motor, col. 6, line 23) is included for driving/actuating the print head.

(2) driving the actuating element to move the printing element to obtain the accurate position (col. 14, lines 1-4).

8. Regarding claim 8, DeLacy further discloses a method for high accuracy media position in a swath printer, wherein said step of mounting the printing element includes mounting the printing element in a carriage (Fig. 3) for sliding movement along a slide rod (Fig. 3, ref #13), and said moving the printing element in a direction transverse to the swath axis includes:

(1) positioning an actuating element between the slider rod and the carriage (Fig. 3); and

(2) driving the actuating element to move the carriage and the printing element to obtain the accurate positioning (Fig. 3, col. 14, lines 1-4).

9. Regarding claim 9, DeLacy further discloses a method for high accuracy media position in a swath printer, wherein said step of mounting the printing element includes mounting the printing element (print head, Fig. 3) in a carriage for sliding movement along a slider rod (Fig. 3), and said moving printing element in a direction transverse to the swath axis includes:

(1) positioning an actuating element between the slider rod and corresponding slider supporting structure (drive motor shaft, Fig. 3, ref # 28); and

(2) driving the actuating element to move the slider rod and with it the carriage and the printing element to obtain the accurate positioning (Fig. 3, col. 14, lines 1-4).

10. Regarding claim 10, DeLacy further discloses a method for high accuracy media position in a swath printer, wherein the step of providing relative motion between the print medium and the printing element includes incrementally moving the printing medium in a direction transverse to the scan axis (this invention is to provide a paper transport system capable of very accurate paper position relative to a print head capable of printing lines orthogonal to a direction of paper advance, col. 3, lines 65-68).

11. Regarding claim 11, DeLacy further discloses a method for high accuracy media position in a swath printer, wherein the printing element includes an ink-jet pen (col. 7, line 33).

12. Regarding claim 12, DeLacy further discloses a method for high accuracy media position in a swath printer, wherein the printing element includes a plurality of ink-jet pens (ink jet print heads, col. 7, line 33) mounted in a carriage, and wherein said step of providing relative motion between the print medium and the printing element includes:

(1) mounting an actuating element (print head, Fig. 3) between each said printing element (paper, Fig. 3) and said carriage (drive belt, Fig. 3);

(2) actuating (col. 14, lines 60-68) each of said actuating elements to move the respective printing elements in a direction transverse to the swath axis.

13. Claims 13-22, 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Delacy (U.S. Patent No. 4734868).

14. Regarding claim 13, DeLacy discloses a swath printer (col. 13, line 28), comprising:

(1) a computer-controlled (microprocessor, col. 12, line 49-54) printing structure (Fig. 3);

(2) a carriage for holding the printing structure (Fig. 12, ref #12, col. 4, lines 31-36), said carriage mounted for movement along (carriage moves along a rod, ref # 13, Fig. 3) a swath axis at a print area for swath printing of an image on a print medium (paper, Fig. 3);

(3) a carriage drive system (drive belt system, Fig. 3) for driving the carriage along the swath axis;

(4) an optical sensor (a sensor such as photosensor (col. 8, line 3) carried on the carriage with said print head for sensing demarcations that function as position references on the paper, col. 4, lines 31-36 and Fig. 3) system mounted to the carriage for sensing the position of an edge of a just printed portion (the sensor senses the location of the edge of the demarcation and provides a positioning feedback signal to the drive means for accurately positioning the print head relative to the demarcation, whereby very accurate positioning of the paper relative to the print head is achieved, col. 4, lines 36-45) of said image which is nominally aligned with the scan axis;

(5) a media advance system (ref #10, 11 and 22 of Fig. 3) for moving the print media along a media path and past the print area;

(6) a fine positioning system (col. 14, lines 30-34) for providing incremental relative motion between the print medium and the printing element to accurately position the printing element in relation to the print medium in dependence on the sensed position of the edge of the just printed portion of the image (the sensor senses the location of the

edge of the demarcation and provides a positioning feedback signal to the drive means for accurately positioning the print head relative to the demarcation, whereby very accurate positioning of the paper relative to the print head is achieved, col. 4, lines 36-45).

15. Regarding claim 14, DeLacy discloses a swath printer, wherein said fine positioning system is actuated to provide relative motion to accurately position the printing element in relation to the print medium between printing successive swaths (successive print lines, col. 10, line 45, and Abstract).

16. Regarding claim 15, DeLacy discloses a swath printer, wherein said fine positioning system is actuated to provide relative motion to accurately position the printing element in relation to the print medium simultaneously (Abstract and col. 14, lines 27-34) as the printing structure is moved along the swath axis.

17. Regarding claim 16, DeLacy discloses a swath printer, wherein said fine positioning system provides relative motion between the print medium and the printing element by moving the printing element (paper, col. 3, line 68) in a direction transverse to the swath axis (this invention is to provide a paper transport system capable of very accurate paper position relative to a print head capable of printing lines orthogonal to a direction of paper advance, col. 3, lines 65-68).

18. Regarding claim 17, DeLacy discloses a swath printer, wherein said fine positioning system includes an actuating element (print head, Fig. 3, ref #12) between the printing structure and the carriage (drive belt, ref # 24, Fig. 3) to move the printing structure to obtain the accurate positioning. It is inherently known in the art that an actuator (i.e. stepper motor, col. 6, line 23) is included for driving/actuating the print head.

19. Regarding claim 18, DeLacy discloses a swath printer, wherein said carriage is mounted for sliding movement along a slider rod (Fig. 3) mounted to a slider rod support structure, and said fine positioning system includes an actuating element disposed between the slider rod and the slider rod support structure to move the slider rod and with it the carriage and the printing element (Fig. 3, col. 14, lines 1-4).

20. Regarding claim 19, DeLacy discloses a swath printer, wherein said carriage is mounted for sliding movement along a slider rod (Fig. 3), and said fine positioning system includes an actuating element disposed between the slider rod and the carriage (drive motor shaft, Fig. 3, ref # 28) to move the carriage and the printing structure to obtain the accurate positioning.

21. Regarding claim 20, DeLacy discloses a swath printer, wherein the fine positioning system incrementally moves the print medium in a direction transverse to the scan axis (this invention is to provide a paper transport system capable of very accurate paper position relative to a print head capable of printing lines orthogonal to a direction of paper advance, col. 3, lines 65-68).

22. Regarding claim 21, DeLacy discloses a swath printer, wherein the printing structure includes an ink-jet pen (col. 7, line 33).

23. Regarding claim 22, DeLacy discloses a swath printer, wherein the printing element includes a plurality of ink-jet pens (ink jet print heads, col. 7, line 33) mounted in a carriage, and wherein said fine positioning system includes an actuating element mounted between each said pen and said carriage (Fig. 3) for moving the respective printing elements in a direction transverse to the swath axis.

24. Regarding claim 24, DeLacy discloses a swath printer, wherein the sensor system includes a first sensor (sensor 31, Fig. 3) mounted on a first side of the carriage and a second sensor (sensor 33, Fig. 3, col. 6, lines 57-64) mounted on a side of the carriage opposite the first side along the swath axis, the sensor system adapted for directional (fine positioning means is responsive to the output of said means for detecting said demarcations to bidirectionally position said paper relative to said print head, col. 14, lines 31-34) sensing operation.

25. Claim 25 is rejected under 35 U.S.C. 102(b) as being anticipated by Delacy (U.S. Patent No. 4734868). DeLacy discloses a method for swath printing, comprising:

(1) printing a first swath of an image on a print medium (Abstract) with an ink-jet printing structure (col. 7, line 33);

(2) advancing the print medium to position the medium for printing a second swath (next line of print, col. 11, lines 28-45);

(3) determine zones of the second swath (a sensor means for determining the position of the paper through edge or mark detection, and a control circuit utilizing the paper position feedback from the sensor to actively control the movement of the paper with respect to the print head, scan head or pen, col. 4, lines 26-30) which need high accuracy swath alignment (col. 4, lines 1-4);

(4) begin printing the second swath (next line of print, col. 11, lines 28-45);

(5) during said printing of the second swath, for those zones which need high accuracy swath alignment, determine the alignment errors (positioning error, col. 11, line 54-62) and store in memory (RAM, col. 12, line 42) appropriate error compensation values;

(6) after completing the printing of said second swath, calculate the next media advance distance (Abstract, col. 11, lines 49-53, and Fig. 11, col. 2, lines 53-67) based on the stored compensation values; and

(7) advancing the media for next swath to be completed (next line of print, col. 11, lines 28-45).

26. Claims 26-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Delacy (U.S. Patent No. 4734868).

27. Regarding claim 26, DeLacy discloses a method for high accuracy media position in a swath printer (col. 13, line 28), comprising:

(1) providing a print medium (paper, col. 1, line 10);

(2) providing a computer-controlled printing element (ink jet print head, col. 7, lines 29-34), the printing element mounted for along a swath axis (Fig. 3, ref # 12) to print a first swath on the print medium;

(3) moving the printing element along the swath axis (the print head is typically caused to ink the paper along a line or bounded series of lines (print band swath) orthogonal to the machine direction, col. 5, lines 37-51) and printing at least a portion of a swath (print line, col. 11, lines 28-35 and Abstract) on the print medium (paper, col.1, line 10);

(4) providing relation motion between the printing element and the print medium to position for a fresh swath (the sensor senses the location of the edge of the demarcation and provides a positioning feedback signal to the drive means for accurately positioning the print head relative to the demarcation, whereby very accurate positioning of the paper relative to the print head is achieved, col. 4, lines 36-45);

(5) sensing the position (sensor, col. 4, line 34) of an edge of the just printed swath (a sensor means for determining the position of the paper through edge or mark detection, and a control circuit utilizing the paper position feedback from the sensor to actively control the movement of the paper with respect to the print head, scan head or pen, col. 4, lines 25-30);

(6) providing relation motion between the print medium and the printing element to accurately position for the fresh swath in dependence on the sensed position of the edge of the just printed swath (the sensor senses the location of the edge of the demarcation and provides a positioning feedback signal to the drive means for accurately positioning

the print head relative to the demarcation, whereby very accurate positioning of the paper relative to the print head is achieved, col. 4, lines 36-45); and

(7) moving the printing element along the swath axis (the print head is typically caused to ink the paper along a line or bounded series of lines (print band swath) orthogonal to the machine direction, col. 5, lines 37-51) to print at least a portion of the fresh swath (next print line, col. 11, lines 28-45).

28. Regarding claim 27, DeLacy further discloses a method for high accuracy media position in a swath printer, wherein said step of providing relative motion between the print medium and the printing element is performed simultaneously with the step of moving the printing element along the swath axis to print at least a portion of the fresh swath (Abstract and col. 14, lines 27-34).

29. Regarding claim 28, DeLacy further discloses a method for high accuracy media position in a swath printer, wherein said providing relative motion between the print medium and the printing element is performed after the printing the first swath and before said moving the printing element along the swath axis to print at least a portion of the fresh swath (an edge 60 (Fig. 9) demarcates the beginning of the reference print line is projected to position 57 (Fig. 9) on photosensor 50 (Fig. 9) to create a position response signal. A signal is used to establish a reference for advancing the paper before beginning the next line of print or scan index, col. 11, lines 28-53).

30. Regarding claim 29, DeLacy further discloses a method for high accuracy media position in a swath printer, wherein providing relative motion between the print medium and the printing element to accurately position for the fresh swath includes:

(1) moving the printing element (paper, col. 3, line 68) in a direction transverse to the swath axis (this invention is to provide a paper transport system capable of very accurate paper position relative to a print head capable of printing lines orthogonal to a direction of paper advance, col. 3, lines 65-68).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

31. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over DeLacy (U.S. 4734868) as applied to claim 1 above, and to Wen et al (U.S. 6334677).

DeLacy does not disclose a swath printer, wherein said fine positioning system includes a piezoelectric actuator for providing the incremental relative motion.

Wen, in the same field of endeavor for swath printer, wherein said fine positioning system includes a piezoelectric actuator (col. 6, lines 41-44) for providing the incremental relative motion.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify DeLacy's swath printing system by the teachings of Wen because of the

following reasons: (1) to minimize the waste of the receiver material (Wen, col. 2, lines 65-67 and col. 3, lines 1-3); thereby, to save cost; (2) to reduce operation time (Wen, col. 3, lines 5-10); thereby, reducing operation cost.

Therefore, it would have been obvious to combine Wen with DeLacy to obtain the invention as specified in claim 23.

32. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over DeLacy (U.S. 4734868) as applied to claim 1 above, and to Wen et al (U.S. 6334677).

DeLacy does not discloses a method for high accuracy media positioning in a swath printer, wherein said moving the printing element in a direction transverse to the swath axis includes:

(1) positioning a piezoelectric element between the printing element and the carriage; and

(2) driving the piezoelectric element to move the printing element to obtain the accurate position.

Wen, in the same of endeavor for high accuracy media positioning in a swath printer, discloses:

(1) positioning a piezoelectric element (col. 6, lines 41-44) between the printing element (print head, Fig. 3) and the carriage (ref. 40, Fig. 3); and

(2) driving (driving gear, Fig. 6) the piezoelectric element to move the printing element to the obtain the accurate position (col. 3, lines 1-4).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify DeLacy's method for high accuracy media positioning in a swath printer by

the teachings of Wen because of the following reasons: (1) to minimize the waste of the receiver material (Wen, col. 2, lines 65-67 and col. 3, lines 1-3); (2) to reduce operation time (Wen, col. 3, lines 5-10).

Therefore, it would have been obvious to combine Wen with DeLacy to obtain the invention as specified in claim 30.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 4916638 to Raselby et al.

U.S. Patent No. 5297017 to Haselby et al.

U.S. Patent No. 5992969 to Terrasa et al.

U.S. Patent No. 4716638 to Ampferer.

U.S. Patent No. 5689294 to Karz et al.

U.S. Patent No. 5250956 to Haselby et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thierry L Pham whose telephone number is (703) 305-1897. The examiner can normally be reached on M-F (8:30 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K Moore can be reached on (703)308-7452. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-3900.

Thierry L. Pham

Sept. 30, 2003

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